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PROCEEDINGS
OF THE
Ohio State Academy of Science

Volume IV, Part 8

SPECIAL PAPERS, No. 12

A Preliminary Catalogue
OF THE
Land and Fresh-water Mollusca
of Ohio

BY

V. STERKI

PUBLISHED BY THE ACADEMY
COLUMBUS, OHIO



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V. STERKI

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COLUMBUS, OHIO

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WILLIAM R. LAZENBY,
C. J. HERRICK,
G. B. HALSTED,

Trustees.

INTRODUCTION

The following catalogue of Ohio Mollusca, an abstract of my hand list, is published at the request of conchologists, and of members of the Ohio Academy. As indicated by the title, it is a preliminary one, imperfect, and not complete either as to the species and forms occurring in the state or as to their distribution. It is based partly on earlier lists, especially those of the vicinity of Cincinnati, by Shaffer, Byrnes, "O. G. B." Harper and Wetherby, and partly on recent collecting in several counties by other conchologists, and my own collecting of over twenty years, in various parts of the State. The only vicinities worked up fairly well, and of which approximately complete lists have been published, are those of Cincinnati, a classical collecting ground for nearly a century, and New Philadelphia, Tuscarawas County. Much careful collecting has been done also in the vicinity of Columbus, since the forties of the last century, by Moores, Higgins, Surface and others, but only a very incomplete catalogue of the land mollusca has been published. The late Geo. W. Dean and his friend, Geo. J. Streator (now in California), have collected principally in Portage County, A. Pettingell in Summit Co., John A. Allen in the vicinity of Cleveland and on the lake islands, and E. L. Moseley at Sandusky.

It is expected that more students of nature, in all parts of the state, will direct their attention to, and collect our land and fresh-water mollusca, recent as well as fossil, wherever such can be found. Very much work is yet to be done, and these animals are of great interest, especially with respect to zoogeography. Then the time will come when it is possible to work up a more complete and elaborate "fauna" of the state, with more data on the distribution over the main drainages, and the various kinds of soil and surface formation, with tables, charts, etc. Also closer comparison with the faunas of neighboring states will then be in place. Earlier work and earlier lists will be reviewed, and literature cited.

During recent years, mollusk lists have been published of the States of New York, Michigan, Indiana, Illinois and Wisconsin, and local lists of Pennsylvania. None of them pretends to be complete; yet, with Ohio added, they facilitate a fair conception of the fauna of this part of the continent.

Ohio, being in the Interior Region of the Eastern Sub-province (W. G. Binney) of the Nearctic Province, has that characteristic fauna, in a general way. Yet there are some

features of special interest. The northern part of the state is in the drainage of the upper St. Lawrence River, which has fresh-water forms of the Atlantic Sub-province mixed with some of the Mississippi drainage. Also there are a number of boreal and circumboreal species. The Northeast, the so-called Appalachian Corner, seems to be inhabited by some specifically Appalachian snails also, e. g. *Gastroponta lasmodon* and *collisella*, *Hyalina lamellidens* and an unidentified *Hyalina*; and more may be found. The southern part of the state has some southern forms, outside of the Streptomatidae and Unionidae of the Ohio River, such as *Gastroponta gularis*, *Omphalina lavigata* and *friabilis*, *Polygyra appressa*, *obstricta* and *stenotrema*, and probably others. Western species extending as far eastward as Ohio, are *Zonitoides laviusculus*, *Vallonia parvula*, *Bifidaria holzingeri*. The distribution of all of these species, and eventually others, should be ascertained more exactly.

But it must be understood that our mollusca are rapidly and considerably decreasing in numbers, by deforestation and cultivation of the land, draining of lakes, ponds and swamps, and consequent disappearance of springs, brooks and smaller creeks, or their being dry during a large part of the year, resulting in the disappearance of mollusca. In the rivers and larger creeks, the water comes to its lowest stages, with sudden floods rapidly receding. Shade, as a protection from insolation, is taken off by cutting down the trees on the banks of water courses. The canals, which were great routes for mollusca, are more and more neglected, and partly abandoned. To this comes the contamination of waters by city sewage and factory refuse, and already a number of rivers are barren of life or rapidly approaching that stage. These factors certainly affect all groups of fresh water animals, not only the mollusca. And of late years, the Unionidae are destroyed in wholesale slaughter, by the shell and pearl hunters. Thus, not only the number of individuals is rapidly reduced, but many species are threatened with extinction over large tracts of the territory. Therefore it is imperative that we take a careful inventory of our fauna as rapidly as possible.

To the main catalogue of recent mollusca are added a few supplements: a list of species not or little known up to recent years, mistaken for or mixed up with others; a list of species not yet known to occur in the state, but probably to be found; lists of fossils collected.

With respect to the general catalogue, a few remarks may be in place. Of common, and widely distributed species, of which Ohio is within the area of general distribution, it was thought

unnecessary to cite numerous localities, except of such as are comparatively little known. "Over the state" seemed sufficient, even if such a species has actually been seen from few places. I am well aware of the fact that some widely distributed, and even generally common species, may be absent over stretches of many miles, or in whole river systems,—if not simply overlooked. To ascertain and register such gaps of distribution*, and also their causes, may be possible when the whole territory is worked up better than it is at the present time. On the other hand, it seemed to be in place to add some notes on such species and forms which are of special interest with respect to either their systematic position, variation or distribution, things which constitute the characteristic features of a local or state fauna.

The list was intended to contain the species and varieties known to occur in Ohio, and recognized as such, seen by myself or cited on good authority. There are, however, a few exceptions, much to my regret. I am not familiar with many of the *Pleurocera* and *Goniobasis*, and also with some *Anodonta* of the St. Lawrence drainage. More material from all over the state, and special study, will be necessary in order to ascertain which of them represent valid species, varieties or local forms, and their distribution.

As varieties, I regard only such forms which, although connected with the typical, somewhere, by intermediate specimens (otherwise they would represent distinct species), maintain their characteristic features over a larger or smaller territory; in short, propagate as such. Individual variations, such as albinos†, reversed (usually sinistrorse) specimens, and shells with imperfectly or abnormally formed apertures, as occasionally found with the normal forms, cannot be regarded as varieties, in the accepted sense of the term.

In regard to classification and nomenclature, I have followed, for the most part, our leading conchologists, in some instances contrary to my own views. A faunal list is not the place for controversies on these topics. Where yet dissenting, I believe to have good reasons, e. g., in adhering to *Hyalina* instead of *Vitrea*, *Patula* instead of *Pyramidula*. *Pisidium* versus *Corneocyclas* has been vindicated by higher authority than myself. For recognizing *Proptera* as a genus, I have given

* As an example of this kind, the fact may be cited that none of the four species of *Proptera* has been found in the Tuscarawas River (with its thirty-six species of Unionidae, and possibly more), while at least two or three of them are widely distributed over the state.

† Such are found especially of many species of *Polygyra* and *Patula*; but I know of no instance where any of them are constant and consequently constitute varieties.

sufficient reasons, and more might be cited. The reasons for my arrangement of the *Unionidæ* are stated elsewhere. As to the terms NEPHROPNEUSTA and BRANCHIOPNEUSTA: Von Ihering has found that the pulmonary cavity of the former has developed in connection with the nephridium, and they are related with the Nudibranchiata, that of the latter from the branchial cavity of the Tectibranchiata. Consequently, Styliommatophora and Basommatophora cannot be ranged, collectively, under one group, Pulmonata, as in contrast to the Prosobranchiata.

Synonyms are added where it seemed necessary or advisable with respect to earlier lists and books to be consulted.

Species introduced from other continents, are not an integral part of the Nearctic fauna, however interesting they may be, in several respects, and in order to mark this, their names are printed in different type (capitals). Certainly they swell the number of species recorded, but the number in itself is not of principal importance. It has been said that species and forms not identified, or of which descriptions have not yet been published, should not be included in faunal lists. In my opinion, they must be there, being parts of that fauna, and their systematic position and characteristic features should be pointed out.

A few words may be in place with respect to the mollusca of Lake Erie. Almost all *Unionidæ* (I have seen about thirty species, and there are probably more), are represented by forms more or less different from those of the rivers, generally being smaller, of different shapes, and often colors. Some of them have been described as species, e. g., *Unio rosaceus* De Kay, *leibei* Lea, *hippopeus* Lea; in fact they are varieties, lake forms, of *Lampsilis luteola*, *Obovaria circulus*, *Quadrula plicata*, respectively. Corresponding forms of other species might, or should, be named and described. Of Sphaeriidæ and Gastropoda, a few lake forms are also known, and more will be found. All mollusca of the lake should be systematically collected, and compared with the inland forms as well as with those of the other great lakes.

It has been suggested that keys for identification be added. I am sorry to say that this could not be done. Simpson states that it is impossible for the *Unionidæ*. After repeated attempts to work up keys for the Sphaeriidæ, I had to give it up, mainly on account of the almost endless variation of a large part of our species. For most of the Prosobranchiata, it would be equally impossible. For identifying the "land mollusca" of Ohio, keys have been published by the Academy*. A few species were added since, but they do not materially affect the keys.

* In the fifth annual report, 1896, (by the writer); I have a number of copies, with additions, on hand, for distribution.

For identification and registration, specimens may be sent to me, and I am also willing to give directions for collecting and preparing such.

To several conchologists, I am under obligation for much valuable information, especially to Mr. Bryant Walker, of Detroit, Michigan.

As it is customary to give the numbers of species listed, the same is done here. The numbers are only approximately correct, *e. g.*, the species of *Pleurocera* and *Goniobasis* may be reduced, those of the Sphæriidæ will be added to.

	NEARCTIC	INTRODUCED	TOTALS
Nephropneusta.....	92	5	97
Branchiopneusta.....	47		47
Prosobranchiata.....	44	1	45
Gastropoda.....	—182		—189
Unionidæ.....	83		83
Sphæriidæ.....	39		39
Pelecypoda.....	—122		—122
Totals.....	303 <u>4</u>	6	311 <u>310</u>

MARKS AND ABBREVIATIONS:

A † (dagger) in front of a name, means: recent addition over earlier lists (except mine, of Tuscarawas Co., 1894 and 1900).

An X after a name: should be looked for especially.

An ! after a locality: I have seen and verified, or identified specimens.

t = teste.

A personal name in parenthesis after a locality, is that of the collector, or sponsor.

"Pal." after a name: the species is also distributed over the Palæarctic province.

New Philadelphia, O., January, 1907.

Catalogue of Recent Mollusca.

GASTROPODA.

NEPHROPNEUSTA.

ZONITIDÆ.

Gastrodonta gularis (Say, Helix). ×

Cited by several conchologists; I have seen no specimens from Ohio.

†**Gastrodonta collisella** Pilsbry. ×

New Philadelphia (St., one specimen of the same form as from eastern Tennessee).

Gastrodonta suppressa (Say, Helix).

Cincinnati; Portage and Tuscarawas Counties (St.); probably over most of the state.

†**Gastrodonta lasmodon** (Phillips, Helix). ×

Rootstown, Portage Co. (St.).

Gastrodonta demissa (Binney, Helix.) ×

"Ohio" (Wetherby).

Gastrodonta ligera (Say, Helix).

Over the state, common.

Gastrodonta intertexta (Binney, Helix).

Over the state, not as common as the preceding.

Gastrodonta interna (Say, Helix).

Columbus, Cincinnati.

Zonitoides nitidus (Müller, Helix).

Pal.

Over the state, at wet and damp localities.

Zonitoides arboreus (Say, Helix).

Over the state, common everywhere; colorless, or greenish, specimens are occasionally found.

Zonitoides limatulus (Ward, Helix).

Columbus; Cincinnati; (not e. g. in Tuscarawas Co.).

Zonitoides minusculus (Binney, Helix).

Over the state, common. A reversed (sinistrorse) specimen was found near New Philadelphia (St.).

†**Zonitoides laeviusculus** (Sterki, Hyalina). ×

Troy! (Shepherd); Tuscarawas Co. (St.).

Zonitoides exiguum (Stimpson, Helix).

Over the state.

Zonitoides milium (Morse, Helix).

Over the state.

Omphalina friabilis (W. G. Binney, Helix). ×

Cincinnati.

Omphalina laevigata (Pfeiffer, Helix). ×

Cincinnati.

Omphalina fuliginosa (Griffith, Helix).

Over the state.

Omphalina inornata (Say, Helix).

Cincinnati; Columbus; Portage Co.! (Streator); Cuyahoga Co.! (Allen); Akron (Walker); probably over most parts the of state, but e. g. not found in Tuscarawas Co.

Omphalina subplana (Binney, Helix), cited from Cincinnati (O. G. B.), has not been found by other conchologists.

†**HYALINA [VITREA] DRAPARNALDI** (Beck, Helix).

Nursery east of Painesville (St.). Introduced from Europe.

†**HYALINA CELLARIA** (Müller, Helix).

Greenhouse at Kent, Portage Co.! (Dean). Introduced from Europe.

†**HYALINA ALLIARIA** (Müller, Helix).

Greenhouse at Painesville (St.). Introduced from Europe.

†**Hyalina wheatleyi** (Bland, Zonites).

Portage Co.! (Streator); Cuyahoga Co.! (Allen); Tuscarawas Co. (St.); probably over the state.

Hyalina radiatula (Alder, Helix), *hammonis* Ström? *electrina* Gould. Pal.

Over the state, common; colorless specimens are found occasionally.

Hyalina binneyana Morse.

Cincinnati; Midvale, Tuscarawas Co. (St.).

†**Hyalina**—sp. ×

Midvale, Tuscarawas Co. (St.). [Umbilicate, spire flat; almost concave, radial striæ very fine, regular and crowded; the same has been seen from the southern Appalachians].

Hyalina indentata (Say, Helix).

Over the state.

†**Hyalina ferrea** (Morse, Striatura).

Portage Co.! (Streator); Summit Co.! (Petingell); Tuscarawas Co. (St.).

Hyalina multidentata (Binney, Helix).

Cincinnati; Portage Co.! (Streator); Summit Co.! (Petingell); Tuscarawas Co. (St.); probably all over the state.

†**Hyalina lamellidens** Pilsbry. ×

Garrettsville, Portage Co., t. Pilsbry.

Euconulus fulvus (Müller, Helix).

Pal.

Over the state, common.

†**Euconulus chersinus** (Say, *Helix*).

Over the state, common; in some sections more common than fulvus, e. g. in Tuscarawas Co. In earlier descriptive works, and lists, these two species were understood as one, under one name or the other.

†**Euconulus sterkii** (Dall., *Hyalina*). X

Summit Co.! (Pettingell); Tuscarawas Co., where the types were collected (St.). Probably over the state, but overlooked for its small size, like some other minute mollusca.

LIMACIDÆ.

†**LIMAX MAXIMUS** Linné.

Cincinnati (Lindahl); Wooster, Agricultural Station! (Webster); Nursery east of Painesville (St.). Introduced from Europe.

LIMAX FLAVUS Linné, introduced from Europe; probably in greenhouses and nurseries; I have seen no specimens.

AGRIOLIMAX AGRESTIS (Linné, *Limax*).

Cincinnati; I have found it at Cleveland, Garrettsville, Ravenna, Navarre, Tiffin, Defiance. Introduced from Europe.*

Agriolimax campestris (Binney, *Limax*).

Over the state, common everywhere. A bluish gray form, or eventually a variety (*plumbeus*) was found at Scio, Harrison Co. (St.), adult and young specimens, side by side with the typical, brownish form, in striking contrast. [Mr. Geo. H. Clapp has found the same at Pittsburg, Pa.]

CIRCINARIIDÆ.

Circinaria concava (Say, *Helix*), *Selenites*, *Macrocyllis concava*.

Over the state, common. Appears to be absent from Put-in Bay, t. Allen.

HELICIDÆ—POLYGYRINÆ.

Polygyra profunda (Say, *Helix*), *Mesodon profunda*.

Over the state. Albino specimens (without reddish bands) are occasionally found.

Polygyra sayana Pilsbry, *Helix diodonta* Say, *sayi* Binney.

Cincinnati (Shaffer).

Polygyra multilineata (Say, *Helix*).

Over the state, especially in river bottoms, swamps, etc. Decidedly variable, with respect to size, shape and color. Specimens without red bands (form *alba*), and reddish all over (form *rubra*) are occasionally found.

*Some conchologists, however, believe it to be native of North America, being so widely distributed.

Polygyra albolabris (Say, *Helix*).

Over the state, common and variable. On the lake islands (Put-in Bay, Kelley's) Allen found a reddish form, constant, in the marshy lowlands; **minor** Sterki, form or var., at New Philadelphia (St.).

Polygyra zaleta (Binney, *Helix*), *exoleta*.

Columbus; Cincinnati; Medina and Defiance Counties (St.); Put-in Bay and Kelley's Islands, uplands (Allen); probably over most of the state, yet wanting over wide stretches, e. g. not found in Tuscarawas Co.

Polygyra thyroides (Say, *Helix*).

Over the state, common in most parts.

Polygyra clausa (Say, *Helix*).

Cincinnati; Columbus; Lorain Co., cited as rare, by Dr. Hubbard, in litt., 1858.

Polygyra mitchelliana (Lea, *Helix*).

Cincinnati; Columbus; Portage Co. (Dean, Streator); Harrison and Tuscarawas Counties (St.); Defiance (St.).

Polygyra pennsylvanica (Green, *Helix*).

Cincinnati; Columbus; Cuyahoga Co. (Allen); Tuscarawas Co. (St.); probably over the state.

Polygyra elevata (Say, *Helix*).

Cincinnati; Columbus; Defiance (St.); probably over at least the southern and western parts of the state.

Polygyra dentifera (Say, *Helix*). ×

Cincinnati (Byrnes); "Ohio," t. W. G. Binney.

Polygyra appressa (Say, *Helix*).

Cincinnati.

Polygyra obstricta (Say, *Helix*). ×

Cited from the state (W. G. Binney); I have seen no specimens.

Polygyra palliata (Say, *Helix*).

Over the state; albinos are found occasionally.

Polygyra inflecta (Say, *Helix*).

Over the state.

Polygyra fraudulenta Pilsbry, *Helix, Triodopsis fallax* auctt.

Over the state, common.

Polygyra tridentata (Say, *Helix*).

Over the state, common and variable. Specimens from various places have the peristome without teeth, or with mere traces of such, but do not constitute a variety.

Polygyra tridentata discoidea Pilsbry.

Cincinnati.

Polygra stenotrema (Say, *Helix*.).

Cincinnati.

Polygyra hirsuta (Say, *Helix*).

Over the state, common. Albinos are not infrequent.

Polygyra fraterna (Say, *Helix*).

- · Over the state, common, albinos are occasionally found.
- · This is what has been taken for *monodon* Rackett, plus
- · var. *fraterna* in earlier descriptions and lists.

Polygyra monodon (Rackett, *Helix*), *leai* Ward.

Cincinnati; Columbus; lake islands! (Allen); Defiance (St.).

Not found e. g. in Tuscarawas Co. This is the *Helix leai*, or *monodon* var. *leai* of descriptive works and lists. At least in Ohio, the two species appear to be distinct, and have always been so regarded by the Cincinnati and Columbus conchologists; at Defiance, I have found the two side by side, without any intermediate specimens.

PHILOMYCIDÆ.

Philomycus carolinensis (Bosc, *Limax*), *Tebennophorus caroliniensis* G. W. Binney.

Over the state, common, but becoming rare in many sections. Variable, and its color variations are said to indicate varieties and even distinct species, by some conchologists. These slugs should be carefully collected and studied.

†**Philomycus** sp.—*pennsylvanicus* Pilsbry? ×

Near Chippewa Lake (St.). Decidedly distinct from the two other species. About 30 mill. long, slender, light colored, the sole tinged with blood-red; the jaw has a number of somewhat rib-like, irregular ridges. The animal is as active as a Limax.

†**Philomycus dorsalis** Binney, *Pallifera dorsalis* Morse. ×

Tuscarawas and Defiance Counties (St.); probably over the state, but overlooked. (It is in none of the Cincinnati catalogues.)

ENDODONTIDÆ.

Patula [Pyramidula] solitaria (Say, *Helix*).

Over the state, less common than the following.

Patula alternata (Say, *Helix*).

Over the state, common, at some places abundant. Albinos are found occasionally, also reversed (sinistrorse) specimens, e. g. at New Philadelphia (St.).

Patula perspectiva (Say, *Helix*)

Over the state, common, preferably in the forests, on and in decaying wood. Albinos are found occasionally.

Patula striatella (Anthony, *Helix*).

Over the state, common, preferably in the open.

Helicodiscus parallelus (Say, Planorbis), *H. lineata* Say.

Over the state, common.

Punctum pygmæum (Draparnaud, Helix), *minutissima* Lea. Pal.

Over the state, common.

Sphyramidium edentulum (Draparnaud, Pupa), *Pupa simplex* Gould.

Pal.

Cincinnati; Hudson, Summit Co.! (Pettingell); Tuscarawas Co. (St.); probably over the state.

Listed as *Pupa*, *Vertigo* and *Isthmia edentula*, but does not range under the Pupidæ (as shown by the writer).

VALLONIIDÆ.

Vallonia pulchella (Müller, Helix).

Pal.

Over the state, common, somewhat variable.

†**Vallonia excentrica** Sterki.

Pal.

Lake, Tuscarawas, Guernsey, Hamilton and Defiance Counties (St.); East Cleveland!, in lawns, by tens of thousands (Allen.); probably over the state. This seems to be one of the few species which have rather increased in numbers, in consequence of deforestation and cultivation of the land.

Vallonia costata (Müller, Helix).

Pal.

Over the state. It has been listed as *pulchella* var. *costata*, but is quite distinct; the ribs are not the only distinguishing feature, but also the shape of the whorls and of the aperture.

†**Vallonia parvula** Sterki. ×

Sandusky (St.); Put-in Bay! (Allen), Walker.

FAM. ——*

Strobilops labyrinthica (Say Helix), *Strobila labyrinthica*.

Over the state, preferably at damp places.

†**Strobilops affinis** Pilsbry. ×

Summit Co.; probably over the state.

†**Strobilops virgo** (Pilsbry, *Strobila labyrinthica virgo*). ×

New Philadelphia (St.); seems to prefer elevated and dry places.

PUPIDÆ.

Pupoides marginata (Say, Odostomia, Pupa), *Pupa fallax* of authors.

Over the state.

Bifidaria procera (Gould, Pupa).

Cincinnati; Columbus; Hamilton (St.); probably over most of the state, but e. g. not found in Tuscarawas Co. Listed as "*Pupa rupicola*" Say, for which (southern species) it has been mistaken.

*Some years ago, I ranged Strobilops under the Pupidæ, but believe that it was a mistake.

Bifidaria armifera (Say, Pupa).

Over the state, common; oftener found at dry places than any other species.

Bifidaria contracta (Say, Pupa).

Over the state, common.

†**Bifidaria holzingeri** (Sterki, Pupa). ×

Cincinnati! (Billups); Troy! (Shepherd); Put-in Bay! (Walker); Kelley's Island! (Allen).

Bifidaria pentodon (Say, Vertigo), *Pupa curvidens* Gould, *Pupa cincinnatensis* Judge.

Over the state, common and variable. This species has been mistaken for and mixed up with *B. tappaniana* ("pentodon"), later known as *curvidens* Gould, recently changed to *pentodon*, by Vanatta and Pilsbry.

Bifidaria pentodon gracilis Sterki.

New Philadelphia (St.). This form is widely distributed outside of Ohio, e. g. in Alabama, and has been regarded as a species by some conchologists.

Bifidaria tappaniana (Adams, Pupa).

Over the state, common. The form **curta** Sterki at wet places. This has been known as *Pupa* and *Bifidaria pentodon* Say; the name was recently changed to the above, by Vanatta and Pilsbry.

Bifidaria corticaria (Say, Odostomia, Pupa).

Over the state.

Pupa (Pupilla) muscorum Müller (nec Linné). ×

Cited from Ohio (and no doubt to be found, being known from New York, Michigan and Illinois).

Vertigo milium (Gould, Pupa).

Over the state.

†**Vertigo morsei** Sterki. ×

Castalia, Erie Co. (St.), and probably over the north-western part of the state, being known from north-east Indiana, and Michigan.

Vertigo ovata Say.

Over the state, common and rather variable.

Vertigo ventricosa (Morse, Isthmia).

Over the state.

†**Vertigo ventricosa elatior** Sterki.

Summit Co.! (Pettingell); Stark and Tuscarawas Counties (St.). Probably over the state. (Has rather the significance of a species.)

(†) **Vertigo pygmæa** (Draparnaud, Pupa), *callosa* Sterki. × Pal.

Columbus! (Hy. Moores a. os.). The most western station known. Rather different from European and North American *pygmæa* seen, and probably a variety, (but

the name, *callosa*, being preoccupied, would have to be changed).

Vertigo decora (Gould, Pupa). Columbus, cited by Surface. The place seems to be outside of the range of its distribution, and probably *pygmæa* was mistaken for it, which I received, as "*modesta*," from the late Hy. Moores.

†**Vertigo tridentata** Wolf.

Summit Co.! (Pettingell); Cincinnati! (Billups); Troy! (Shepherd); Tuscarawas Co., Columbus, Hamilton (St.). Probably all over the state.

†**Vertigo parvula** Sterki. ×

Summit Co.! (Pettingell).

Vertigo gouldii (Binney, Pupa).

Summit Co.! (Pettingell); Portage and Tuscarawas Co.s (St.). Probably over the state.

COCHLICOPIDÆ

Cionella lubrica (Müller, Helix), *Cochlicopa lubrica*, *Ferussacia subcylindrica* auctt, not Linné.

Over the state.

SUCCINEIDÆ.

Succinea ovalis Say, *obliqua* Say.

Cincinnati; Medina and Tuscarawas Counties. (rare, St.).

Succinea retusa Lea, *ovalis* Gould.

Over the state, common and variable.

Succinea retusa higginsi Bland.

Sandusky; Put-in Bay; South Bass Id. (Walker). Seems to be a form of *retusa*.

Succinea aurea Lea. ×

Cincinnati. The Cincinnati conchologists have regarded it as a distinct species; others regard it as a form, or variety of *retusa*. Not being familiar with it, I am unable to judge on its merits.

Succinea avara Say.

Over the state, common everywhere.

Succinea avara vermeta Say. ×

Tuscarawas Co. (St.).

It seems that this form is not simply an incidental form of *avaræ*, being absent at many places where that sp. is common, but more or less prevalent, or common at some stations, and consequently a variety.

BRANCHIOPNEUSTA.

AURICULIDÆ.

Carychium exiguum (Say, Pupa).

Over the state, common and variable.

†**Carychium exile** H. C. Lea.Over the state; seems to be more on elevated and dry places than *exiguum*, although the two are found associated.

PHYSIDÆ.

Physa ancillaria Say. ×

Summit Co.

†**Physa ancillaria magnalacustris** Walker.

Lake Erie (St.), t. Walker.

Physa sayi Tappan.

Meyer's Lake, Canton (St.); "Pippin Lake, Portage Co.," from where the species was originally described.

Physa heterostropha Say.

Cincinnati; Cleveland (Allen); Tuscarawas Co. (St.); probably over the state.

Physa gyrina Say.

Over the state, common and very variable.

Physa gyrina elliptica Lea.

Tuscarawas and Medina Counties (St.).

Physa gyrina hildrethiana Lea.

La Grange, Lorain Co. (Walker).

Physa integra Say.

Over the state, preferably in rivers and creeks.

Physa anatina Lea.Tuscarawas river, and Nimishillen Creek, at Canton (St., t. Walker). May be a variety of *integra*.†**Physa aplectoides** Sterki. ×

Portage Co.! (Streator); Tuscarawas Co. (St.). Very small and slender; distinct, t. Walker.

Aplexa hypnorum (Linneé, Bulla).

Over the state; at some places out of water, on damp ground, e. g. Tuscarawas Co. (St.).

LYMNÆIDÆ.

Lymnaea stagnalis Linné.

Pal.

Kent, Portage Co. (Dean).

†**Lymnaea megasoma** Say. ×

Mahoning River at Alliance (St.)

Lymnaea palustris Müller, *elodes* Say.

Pal.

Over the state.

Lymnæa reflexa Say.

Cincinnati; Lockland, Hamilton Co.; Sandusky; La Grange, Lorain Co. (Walker); Cleveland (Allen); Garrettsville.

Lymnæa reflexa kirtlandiana Lea, *exilis* Lea?

Cincinnati; Cuyahoga Co.! (Allen); pond near Congress Lake (Walker); Poland (Walker); Tuscarawas Co. (St.). Regarded as distinct by some conchologists.

Lymnæa columella Say.

Over the state, common.

Lymnæa columella chalybea Gould.

Kent, Portage Co. (Walker).

Lymnæa catascopium Say.

Cincinnati; Lake Erie.

Lymnæa desidiosa Say, *obrussa* Say, t. Baker.

Over the state, common and very variable.

†Lymnæa desidiosa modicella Say.

Summit, Stark and Tuscarawas Counties (St.); Hiram, Portage Co. (Streater, Walker); Circleville (Walker). Probably over the state.

Lymnæa humilis Say.

Over the state, common and variable; often out of water, on damp ground. Probably this Lymnæa was found, common, on flower pots, in a greenhouse at Painesville (St.).

Lymnæa humilis var ——, t. Baker (unnamed).

New Philadelphia (St.), with strongly malleate surface and open umbilicus.

†Lymnæa sterkii Baker ×

Near Dover, Cuyahoga Co. (St.).

†Lymnæa parva Lea.

Summit, Tuscarawas, Franklin, Butler, Auglaize and Defiance Counties (St.). Probably all over the state, but overlooked until recently.

Lymnæa caperta Say.

Cuyahoga Co.! (Allen); Elyria (Walker); common in Portage, Summit and Stark Counties, rare in Tuscarawas Co. (St.). It is listed in none of the Cincinnati catalogues.

Lymnæa haldemani Deshayes, *gracilis* Jay. ×

Sandusky Bay (Walker); cited from Congress Lake.

Planorbis glabratus Say. ×

Cincinnati (Harper and Wetherby).

Planorbis trivolis Say.

Over the state, common and variable. A specimen of 26 mill. diam. was found in the Nimishillen Creek, at Canton (St.).

Planorbis trivolis latus Say.

Cincinnati; Columbus (Walker).

Planorbis campanulatus Say.

Summit, Stark and Tuscarawas Counties (St.).

Planorbis bicarinatus Say.

Over the state, common.

Planorbis dilatatus Gould.

Over the state.

†**Planorbis dilatatus buchanensis** Lea (t. Walker).

New Philadelphia (St.).

†**Planorbis opercularis multilineatus** Vanatta, *opercularis oregonensis* Vanatta. ×

Geauga Lake, east of Cleveland (Allen, t. Vanatta).

Planorbis excacuous Say, *exacutus*.

Over the state.

†**Planorbis rubellus** Sterki, *exacutus var. rubellus*.

Portage Co.! (Streator); Summit, Stark and Tuscarawas Counties (St.).

†**Planorbis umbilicatellus** Cockerell. ×

Summit and Tuscarawas Counties (St.).

Planorbis deflectus Say. ×Garrettsville, Portage Co. (Streator, t. Walker); Tuscarawas Co. (St.). This needs careful revision, since specimens of several other species have been identified as *deflectus*.**Planorbis albus** Müller, *hirsutus* Gould.

Pal.

Stark and Tuscarawas Counties (St.); probably over the state.

Planorbis parvus Say.

Over the state, common and variable.

†**Planorbis circumlineatus** Tryon.Summit and Tuscarawas Counties (St.). Some conchologists regard it as a variety of *parvus*; so far as my materials show, it appears to be distinct; at any rate not simply a synonym of *parvus*.**Segmentina armigera** (Say, Planorbis).

Over the state, common, preferably in quiet water.

ANCYLIDÆ.

Ancylus diaphanus Haldeman.

Cincinnati; Tuscarawas Co. (St.).

Ancylus fuscus Adams.

Cincinnati; Tuscarawas Co. (St.).

†**Ancylus Kirklandi** Walker.

Summit Co. (Walker); Tuscarawas Co., e. g. common in the Tuscarawas River (St.).

Ancylus parallelus Haldeman. ×

Ohio Canal at Navarre, Stark Co. (St.).

Ancylus tardus Say.

Cincinnati; Tuscarawas Co. (St.). Probably over the state.

Ancylus rivularis Say.

Cincinnati; Cuyahoga River (Allen); Tuscarawas Co. (St.).

†Ancylus sterkii Walker, MS.

Tuscarawas River, common; Maumee River (St.). [Shell rather small, slender, with the apex decidedly posterior, near the right margin, and markedly oblique.]

Ancylus shimeki Pilsbry. ×

Tuscarawas Co. (St.).

†Ancylus pumilus Sterki.

Tuscarawas River (types), Miami Canal at Hamilton (St.).

†Gundlachia —? meekiana Stimpson. ×

Pools near New Philadelphia (St.). Thornburg, Cuyahoga Co., on Nuphar leaves in a slough on the Cuyahoga River (Allen), may be of another species.

†Gundlachia ? sp. ×

Tuscarawas Rixer at New Philadelphia (St.). [The same has been seen from Indiana; very small, 2 mill. long, and of a shape quite different from other Gundlachia; may represent a distinct genus.]

PROSOBRANCHIATA.

HELICINIDÆ.

Helicina occulta (Say, Helix), has been cited, but I have seen no specimens.

VIVIPARIDÆ.

Campeloma ponderosum (Say, Paludina).

Ohio River.

Campeloma subsolidum (Anthony, Paludina.)

"Ohio, northern part;" Ohio Canal near Cleveland (Allen).

Campeloma integrum (Say, Paludina).

Over the state, common. Regarded as a variety of *decisum*, by some conchologists.

Campeloma integrum obesum Lewis.

Cincinnati; Miami Canal at Middletown, Ohio Canal at Columbus; Hudson, Summit Co. (Walker).

Campeloma decisum (Say, Lymnæa, Paludina).

Lake Erie and tributaries; Mahoning River, Miami River, Miami Canal (Walker).

Campeloma decisum fecundum Lewis.

Ohio Canal at Columbus, Miami Canal at Cincinnati (Walker)

Campeloma rufum (Haldeman, Paludina).

Canal at Columbus (Call); Summit and Tuscarawas Counties (St.). Sandusky River (St.). Possibly not distinct from *integrum*.

Lioplax subcarinatus (Say, Paludina).

Ohio River; Lake Erie,—tributaries?

STREPOMATIDÆ (Pleuroceridæ).

Pleurocera canaliculatum (Say, Melania).

Ohio River; Tuscarawas River, rare (St.).

Pleurocera elevatum (Say, Melania).

“Ohio.”

Pleurocera undulatum (Say, Melania), = *moniliferum* Lea?

Ohio River.

Pleurocera neglectum, Anthony.

Ohio River at Cincinnati; Great Miami River, Ohio Canal at Circleville (Walker).

Pleurocera labiatum Lea (= var. of *neglectum*?).

Cincinnati; Scioto River.

Pleurocera conicum (Say, Melania).

Cincinnati.

Pleurocera subulare (Lea, Melania).

Lake Erie, common.

Other species listed from Ohio:

Pleurocera ellipticum Anthony.

Pleurocera pallidum Lea.

Pleurocera simplex Say.

Pleurocera troostii Lea.

Goniobasis livescens (Menke, Melania).

Over the state, common and variable.

Goniobasis livescens depygis Say.

Over the state. Seems inseparably connected with *livescens*, although extreme forms of the two are very different; e. g. in the Tuscarawas River all possible intermediate forms are found together—abundant.

Goniobasis semicarinata (Say, Melania).

Cincinnati; Rocky River (Allen).

Goniobasis vicina Anthony.

“Ohio” (Walker.)

Goniobasis pulchella Anthony.

Cincinnati; Little Miami River (Walker).

Goniobasis gracilior Anthony.

Kent, Portage Co., Springfield Lake (Walker); Ohio Canal and Tuscarawas River at New Philadelphia (St., t. Simpson).

Goniobasis elata Anthony.

Elyria, Vermilion River (Walker).

Goniobasis brevispira Anthony.

Gambier, Knox Co. (Walker).

Goniobasis exilis Haldeman.

Scioto River (Walker).

Goniobasis laqueata Say.

"Ohio" (Walker).

Other species (?) listed from Ohio:

Goniobasis gibbosa Lea.

Goniobasis haldemani Tryon.

Goniobasis infantula Lea.

Goniobasis lithasioides Lea (= var. of *livescens*?).

Goniobasis ohioensis Lea.

Lithasia obovata Say. ×

Ohio River, up to Marietta (Call.).

Angitrema verrucosum Rafinesque.

Ohio River at Cincinnati.

Anculosa costata Lea (= *carinata* Bruguière?).

Ohio River.

Anculosa prærosa Say.

Ohio River.

Anculosa trilineata Say (= *viridis* Lea, syn. or var.?).

Ohio River.

RISSOIDÆ (s. lat., AMNICOLIDÆ etc.).

BITHYNIA TENTACULATA (Linné, Turbo).

Lake Erie! (Streator); Ohio Canal in Stark Co. (St.). Introduced from Europe, and now widely distributed over various states. The central part of the operculum is distinctly spiral, not concentric!

Somatogyrus subglobosus (Say, Paludina), *isogonus* Say.*

Over the state. A form from the Ohio River, at Cincinnati (St.), is rather different and may represent a variety.

Somatogyrus integer (Say, Melania).

Over the state, common.

Pomatiopsis lapidaria (Say, Cyclostoma).

Over the state, common; often far away from water.

Pomatiopsis cincinnatensis (Anthony, Cyclostoma).

Cincinnati; Columbus.

Amnicola limosa (Say, Paludina).

Over the state, common and variable.

Amnicola limosa porata Say.

Meyer's Lake at Canton (St.).

Amnicola limosa parva Lea.

New Philadelphia.

*Some conchologists, e. g. F. C. Baker, regard *S. isogonus* as distinct from *subglobosus*.

†Amnicola lustrica Pilsbry.

Cuyahoga River; Springfield Lake; Ohio Canal at New Philadelphia (St.). Probably over the state.

Amnicola cincinnatensis (Lea, Cyclostoma).

Over the state, common in rivers and creeks.

†Amnicola walkeri Pilsbry.

Geauga Lake, east of Cleveland! (Allen).

†Amnicola pilsbryi Walker. ×

Meyer's Lake at Canton, Ohio Canal at New Philadelphia (St.).

†Amnicola nickliniana Lea. ×

Springfield Lake.

†Amnicola emarginata Küster, *obtusa* Lea.

Lake Erie and tributaries; Ohio canal at Navarre and New Philadelphia (St.).

†Amnicola — sp., undescribed, t. Walker. ×

Lake Erie and Ohio Canal in Stark Co. (St.). [The shell is small and very slender, very different from all other Ohio Amnicolæ.]

†Lyogyrus pupoides (Gould, Valvata). ×

Springfield Lake (St.).

VALVATIDÆ.

Valvata tricarinata Say.

Over the state, common in all kinds of waters. Forms with one or two keels more or less obsolete are found with typical specimens.

Valvata tricarinata simplex Gould.

Lake Erie at Sandusky (Walker).

Valvata bicarinata Lea. ×

I have seen no specimens of the typical form from Ohio.

Valvata bicarinata depressa Walker.

Lake Erie at Sandusky and Vermilion (St.).

Valvata sincera Say. ×

"Ohio."

†Valvata lewisi Currier, *striata* Lewis. ×

Springfield Lake (St.).

PELECYPODA.

UNIONIDÆ.

Truncilla triquetra Rafinesque.

Both drainages, Lake Erie.

Truncilla sulcata (Lea, Unio), *U. ridibundus* Say = female. ×
Ohio River.**Truncilla sulcata delicata** Simpson. ×
Lake Erie drainage—?**Truncilla foliata** (Hildreth, Unio). ×
Ohio River, Cincinnati.**Truncilla personata** (Say, Unio), *U. pilcus* Lea. ×
Ohio River - and tributaries?**Trincilla perplexa** (Lea, Unio).
Ohio River; Scioto River.**Truncilla perplexa rangiana** Lea.
Ohio, Scioto, Tuscarawas, Mahoning Rivers.**Truncilla perplexa cincinnatensis** Lea.
Ohio River at Cincinnati.**Micromya fabials** (Lea, Unio), *U. lapillus* Say.
Both drainages; in nearly all rivers.**Lampsilis ventricosa** (Barnes, Unio), *U. subovatus* Lea is the
male form, *occidens* Lea, the female.
Over the state, decidedly variable; common in Lake Erie,
very small to medium sized, of somewhat peculiar
shape and appearance, representing a variety.**Lampsilis capax** (Green, Unio). ×
Ohio River.**Lampsilis ovata** (Say, Unio).
Ohio River; Great Miami River (Walker).**Lampsilis multiradiata** (Lea, Unio).
Both drainages, over the state.**Lampsilis luteola** (Lamarck, Unio).
Over the state, common and variable; common in Lake
Erie and decidedly variable, some forms being very
small.**Lampsilis luteola rosacea** DeKay.
Lake Erie.**Lampsilis radiata** (Gmelin, Mya). ×
St. Lawrence drainage; Portage River! (Oberlin collection).**Lampsilis ligamentina** (Lamarck, Unio).
Both drainages, generally common; abundant e. g. in the
Tuscarawas River, large and much inflated. Not in
. the Mahoning River, t. Dean —?

Lampsilis ligamentina gibbus Simpson.

Ohio River.

Lampsilis orbiculata (Hildreth, Unio). ×

Ohio River and probably some of its tributaries.

Lampsilis higginsii (Lea, Unio) is considered a variety of *orbiculata*, by some conchologists; I have not seen it from Ohio. ×

Lampsilis anodontoides (Lea, Unio).

Ohio River; Great Miami River (large).

†**Lampsilis fallaciosa** (Smith) Simpson. ×

Ohio River at Cincinnati (St.), and probably at other places.

Lampsilis recta (Lamarck, Unio).

Both drainages; Lake Erie (small); not in the Mahoning River, t. Dean.

Lampsilis nasuta (Say, Unio).

St. Lawrence drainage, Lake Erie; probably also in the Ohio drainage, at least along the divide. In Muzzy Pond, near Rootstown, Portage Co., specimens were found (St.), to 118 mill. long, the largest of any known, t. Simpson.

Lampsilis subrostrata (Say, Unio). ×

"Ohio;" I have seen no specimens (although it is doubtless at least in the north-western part of the state).

Lampsilis iris (Lea, Unio). *L. Novi Eboraci* Lea = syn. or var.?

Both drainages; Lake Erie (St.).

Lampsilis ellipsisformis (Conrad, Unio), *U. spatulatus* Lea.

Ohio River.

Lampsilis glans (Lea, Unio).

Both drainages; Ohio River; Maumee and Auglaize Rivers (St.); not in the Tuscarawas River.

Lampsilis parva (Barnes, Unio).

Over the state (both drainages, Lake Erie); rivers, creeks and canals.

Plagiola securis (Lea, Unio); *Obovaria lineolata* Rafinesque?

Ohio River.

Plagiola elegans (Lea, Unio).

Both drainages; Ohio and Little Miami Rivers; Maumee and Tiffin Rivers (St.); Lake Erie (Prof. Moseley, St.); not in the Tuscarawas River.

Plagiola donaciformis (Lea, Unio), *U. zigzag* Lea.

Both drainages, Lake Erie.

Obovaria circulus (Lea, Unio).

Over the state. So far as evidence goes, *U. lens* Lea is the female form, *circulus* the male, the latter generally much the larger.*

* These male and female forms are much more different from each other in shape, than those of *ellipsis*, and of *retusa*.

Obovaria circulus leibei (Lea, *U. leibei*).

Lake Erie.

"Obovaria lens var. *depygis*, Conrad."

"Ohio," in check list, is unknown to me.

Obovaria ellipsis (Lea, *Unio*).

Ohio River, common.

Obovaria retusa (Lamarck, *Unio*).

Ohio River.

Cyprogenia irrorata (Lea, *Unio*).Ohio drainage: Ohio, Great Miami, Scioto, Tuscarawas,
Mahoning Rivers.**Obliquaria reflexa** Rafinesque, *U. cornutus* Barnes.Both drainages, but not everywhere; Ohio, Scioto, and
Mahoning Rivers, not in the Tuscarawas; Lake Erie (St.).**Ptychobranchus phaseolus** (Hildreth, *Unio*).

Both drainages, Lake Erie.

Tritogonia tuberculata (Barnes, *Unio*).

Ohio drainage, generally.

Quadrula plicata (Say, *Unio*).

Ohio and Little Miami Rivers.

Quadrula plicata hippopœa Lea. ×

Lake Erie.

Quadrula undulata (Barnes, *Unio*).

Both drainages, generally common.

Quadrula heros (Say, *Unio*), *U. multiplicatus* Lea.

Ohio River, Little Miami River.

Quadrula cylindrica (Say, *Unio*).

Ohio River and most or all of its tributaries. Some specimens have none of the nodose projections, e. g. from the Tuscarawas River.

Quadrula metanevra (Rafinesque, *Obliquaria*).

Ohio River, common.

Quadrula metanevra wardii Lea.Ohio River; Sugar Creek, tributary to the Tuscarawas River (St.), but not a trace of it was found in the River, nor of typical *metanevra* in the river or creek.**Quadrula tuberculata** (Rafinesque, *Obliquaria*).

Ohio River; Little Miami River; Tuscarawas River (St.), large and heavy, often with regular transverse undulations above the posterior umbonal ridge; Maumee and Tiffin Rivers, near Defiance (St.).

Quadrula granifera (Lea, *Unio*).

Ohio River; tributaries?

Quadrula lachrymosa (Lea, *Unio*), *U. asperrimus* Lea.

Both drainages, decidedly variable. The Lake Erie form is little inflated and has few tubercles; a similar form in the Ohio Canal near Cleveland (Allen); not in the Tuscarawas River.

Quadrula fragosa (Conrad, Unio).

Ohio River at Cincinnati, seems rare; Scioto River.

Quadrula pustulosa (Lea, Unio).

Ohio River and most of its tributaries; decidedly variable in regard to size, shape, and surface sculpture: from smooth to covered with tubercles all over.—A form from the lake drainage, e. g. the Tiffin River (St.), is considerably different from the high, *cooperiana*-like form of the Ohio River and tributaries: more elongate, "quadrate," approaching *lachrymosa* in outlines; the same is known from Michigan, Indiana (Kankakee River, St.), Illinois and Iowa (t. Walker), and seems to represent a variety, may be = *schoolcraftensis* Lea. ×

Quadrula pustulosa kleineriana Lea.

"Entire Mississippi drainage; Lake Erie," t. Simpson.

Quadrula cooperiana (Lea, Unio).

Ohio River; tributaries?

Quadrula pustulata (Lea, Unio).

Ohio River at Cincinnati; Mahoning River (Dean, Streator); cited from the Tuscarawas River, by Dean; I was not able to find a trace of it and suppose some form of *pustulosa* was mistaken for it.

Quadrula subrotunda (Lea, Unio).

Ohio River; Scioto River; Tuscarawas River, a form with very heavy shell, the beaks quite anterior, the shape of the mussel being much like that of *Pl. clava*, the lines of growth coarse and markedly regular; a very small, slight form seems to be in Lake Erie.

Quadrula kirtlandiana (Lea, Unio).

Ohio River and some tributaries: Mahoning River, from which Lea had his types; Tuscarawas River, common and very variable, from the *subrotunda* form to much elongate, and some specimens much resembling (old) *aesopus*; one large and heavy specimen has numerous small muscle scars scattered all over the inner surface within the pallial line. It seems that *kirtlandiana* is doubtfully distinct from *subrotunda*, and half grown specimens agree with Lea's description and figure of the last named species.

Quadrula aesopus (Green, Unio).

Ohio River and tributaries, Scioto, Mahoning, Tuscarawas.

NOTE.—*aesopus* certainly ranges nearer the *Quadrula* of this group than with *Pleurobema*; it closely resembles *kirtlandiana* in features of the shell and soft parts. [Simpson himself was in doubt where to range this and the following species.]

Quadrula cicatricosa (Say, *Unio*), *varicosa* Lea.

Ohio River.

Quadrula pilaris (Lea, *Unio*).

Ohio River at Cincinnati.

Quadrula ebena (Lea, *Unio*).

Ohio River.

Quadrula pyramidata (Lea, *Unio*).

Ohio River and tributaries; large and heavy specimens in the Tuscarawas River.

Quadrula plena (Lea, *Unio*).

Ohio River.

Quadrula obliqua (Lamarck, *Unio*).

Ohio River, and some tributaries.

Quadrula solida (Lea, *Unio*).

Ohio River; Scioto River.

These last four species are closely related to each other, and should be revised.

Quadrula trigona (Lea, *Unio*).

Both drainages, not common.

Quadrula rubiginosa (Lea, *Unio*).

Over the state, generally common.—In some specimens from various rivers (Ohio, Tuscarawas, Tiffin), where the gonad was for the most part a testis ("males"), a few acini were found to be ovarian, containing ova.

Quadrula coccinea (Conrad, *Unio*).

Over the state, variable. In the Tuscarawas River is a form higher than the "typical" one, resembling *kirtlandiana* in shape, but with the soft parts quite different, and usually with a few undulations in the middle of the disks; it may represent a variety.

Quadrula coccinea paupercula Simpson.

St. Lawrence drainage; probably in the state.

Pleurobema clava (Lamarck, *Unio*).

Both drainages; e. g. in the Maumee; not in the Cuyahoga River, t. Dean.

Pleurobema bournianum (Lea, *Unio*). ×

Scioto River; Ohio River at Cincinnati (Byrnes).

Unio crassidens Lamarck.

Ohio River, common; Scioto River.

Unio gibbosus Barnes.

Over the state, common and variable in regard to size, shape and color of the nacre: dark purple to salmon to white (the latter = *arctior* Lea); a very small form, with the beaks more anterior, is in Lake Erie.

Unio tetralasmus camptodon Say.

Ohio River at Cincinnati; Great and Little Miami Rivers.

Unio tetralasmus sayi Ward.

Scioto River, e. g. at Circleville (type locality).

Unio complanatus (Solander) Dillwyn. ×

St. Lawrence drainage; (among numerous Unionidæ collected from Lake Erie, at Sandusky and Vermilion, at various times, no specimens were seen, St.). One was found in a race on the Tuscarawas River, at New Philadelphia; evidently the mussels have migrated from Lake Erie, over the divide, probably by way of the Ohio canal.

Margaritana monodonta (Say, *Unio*).

Ohio River at Cincinnati (still!), but not common.

Proptera alata (Say *Unio*).

Both drainages; large e. g. in the Great Miami River; common in Lake Erie, rather small.

Proptera laevissima (Lea, *Sympynota*), *U. ohioensis* Say.

Ohio River, and tributaries—?

Proptera gracilis (Barnes, *Unio*).

Both drainages; common in Lake Erie.

Proptera leptodon (Rafinesque, *Unio*), *Sympynota tenuissima* Lea.

Both drainages, not common; a specimen from "Cleveland" is in the Oberlin collection.

None of the four Proptera species have been found in the Tuscarawas River.

Sympynota compressa Lea (known as *Unio pressus* Lea).

Over the state.

Sympynota costata (Rafinesque, *Alasmidonta*), *Al. rugosa* Barnes.

Over the state; the Lake Erie form is quite small and of somewhat different shape.

Sympynota complanata (Barnes, *Alasmidonta*).

Over the state, in rivers, creeks, canals, lakes.

Alasmidonta marginata Say, *Al. marginata* var. *truncata* B. H. Wright, *Al. truncata* Simpson, Synopsis.

Over the state, both drainages; a small, slight form in Lake Erie.

Alasmidonta — (the eastern, or Atlantic drainage form, or species): Lake Erie and tributaries (?). ×

Alasmidonta calceolus (Lea, *Unio*), *Margaritana deltoidea* Lea.

Over the state, common.

Arcidens confragosus (Say, *Alasmidonta*.)

Ohio River at Cincinnati.

Lastena lata (Rafinesque, *Anodonta*—*Lastena*), *U. dehiscens* Say.

Ohio drainage, not common.

Hemilastena ambigua (Say, Alasmodontata), *U. hildrethianus* Lea.
Ohio drainage; Lake Erie (St.).

Strophitus edentulus (Lea, Anodonta).

Over the state, common and very variable. A very small, slight form, much inflated, in Lake Erie, seems to represent a variety.

Strophitus edentulus pavonius Lea.

Over the state; very small e. g. in a run in Portage Co. (St.-t. Simpson); very large in the Mahoning River, at Alliance (St.); Tuscarawas River, with the common form of *edentulus*, and merging into it (St.).

Anodontoides ferussacianus (Lea, Anodonta).

Over the state.

Anodontoides ferussacianus subcylindraceus Lea.

Pymatuning River in Ashtabula County, Grand River, Silver Creek in Portage Co.; Olentangy River at Delaware (Walker); Burton City, Wayne Co. (St.).

Anodontoides ferussacianus modestus Lea.

St. Lawrence drainage, Lake Erie.

Anodonta grandis Say.

Over the state, very variable.

Anodonta grandis plana Lea.

Scioto River, Columbus; Miami Canal; Ohio Canal at Canal Winchester (Walker); Sandusky River (St.).

Anodonta grandis decora Lea.

Mahoning River; Silas Creek, Portage Co.; Columbus; Little Miami River; Miami Canal; Little Stillwater Creek near Denison (St.).

Anodonta grandis salmonia Lea.

Tuscarawas River and Ohio Canal (St.); Upper Cuyahoga River, at Hiram (Streator, St.); Pymatuning River, Ashtabula Co. (Walker); Silver Lake, Clark Co.; Olentangy River (Walker).

Anodonta grandis benedictensis Lea.

St. Lawrence drainage; Rocky River (Allen); Lake Erie (St.).

Anodonta grandis footiana Lea.

St. Lawrence drainage; Springfield Lake, Summit Co. (St.); cited from Cincinnati.

For citing localities for these varieties, and identifying specimens, I am largely indebted to Mr. Bryant Walker.

Anodonta marginata Say. ×

St. Lawrence drainage; Hudson, Summit Co.

Anodonta imbecillis Say.

Over the state, common, in all kinds of waters. The animal is hermaphrodite.

Of the following three species, of the St. Lawrence drainage, I have seen no specimens:

Anodonta implicata Say. ×

Anodonta pepiniana Lea. ×

Anodonta kennicottii Lea. ×

SPHÆRIIIDÆ.

Sphærium simile (Say, Cydas), *Cyclas sulcata* Lamarck, *Sphærium*

· · · *sulcatum* Prime, Mon. Corb.

· · · Over the state, in various kinds of waters.

Sphærium striatinum (Lamarck, Cydas).

Over the state; very variable in size, shape, striation, color, etc. Some Sphæria provisionally ranged under *striatinum*, may prove distinct species, e. g. a form from Geauga Co. (Streator), seems identical with a Potomac River Sphærium.

Sphærium solidulum (Prime, Cydas).

Over the state, variable. The typical form, as it seems, especially in the western part of the state.

Sphærium stamineum (Conrad, Cydas).

Over the state, very variable, and there are, probably, a number of varieties.

†**Sphærium flavum** (Prime, Cydas). ×

Lake Erie (St.), and probably some of its tributaries.

Sphærium fabale (Prime, Cydas).

Hamilton Co. (Walker; the species is in none of the Cincinnati lists); Portage Co. (Streator, St.); Summit and Stark Counties (St.). Probably over most of the state.

Sphærium rhomboideum (Say, Cydas).

Portage Co.! (Streator); Summit, Stark and Tuscarawas Counties (St.); Columbus; Cincinnati.

Sphærium occidentale Prime.

Over the state, common in quiet waters, ponds, ditches, swamps.

Sphærium occidentale amphibium Sterki.

Living on damp ground, under dead leaves, etc.; smaller than the typical form, and of somewhat different shape and appearance. Garrettsville! (Streator); Tuscarawas Co., various places (St.).

Musculium transversum (Say, Cydas), *Sphærium*, *Calyculina transversa*.

Over the state, common in all kinds of waters, even in rivers with rocky bottom, e. g. the Sandusky at Tiffin (St.).

Musculium contractum? (Prime, Sphærium), was seen among a mixed lot supposed to be from Ohio (Cincinnati museum).

Musculium partumeium (Say, *Cyclas*), *Sphaerium*, *Calyculina part.*

Over the state, in quiet waters; variable.

A form: more rounded in outlines, more regularly inflated, with broad, low beaks, smaller than typical *partumeia*, seems to represent a variety. Garrettsville! (Streator); New Philadelphia (St.); a simliar form from Mentor (Allen).

†Musculium jayense (Prime, *Cyclas*), *Sphaerium jayanum* Prime, Mon. Corb.

Cincinnati; probably over western Ohio.

†Musculium truncatum (Linsley, *Cyclas*), *Sphaerium*, *Calyculina tr.*

Portage Co. (Streator, St.); Geauga and Cuyahoga Counties! (Allen); Stark and Tuscarawas Counties (St.); probably all over the state.

Musculium securis (Prime, *Cyclas*), *Sphaerium*, *Calyculina securis*.

Over the state, common in ponds, pools, ditches, variable.

Seyeral forms seen are considerably different and may represent varieties or even distinct species.

Musculium sphaericum (Anthony, *Cyclas*), described from the Black River, Lorain Co., is believed to be a form of *securis*; I have seen no authentic specimens.

†Musculium sp. — ×

Geauga Lake, east of Cleveland (Allen). [Quite distinct from all other species, and probably underscribed; the same has been seen from Michigan, Indiana and Illinois].

Pisidium virginicum (Gmelin, *Tellina*, *Cyclas dubia* Say).

Cuyahoga River and Breakneck Creek, Portage Co., Nimi-shillen Creek, Stark Co.; Auglaize River (all: St.); Cincinnati.

Pisidium compressum Prime. (The "river form," regarded as typical).

Over the state, common in rivers and creeks, rarely in springs.

Pisidium compressum laevigatum Sterki.

Springfield Lake, Meyer's Lake (St.); in quiet waters.

Pisidium compressum opacum Sterki.

Sloughs on the Tuscarawas River (St.).

†Pisidium kirklandi Sterki. ×

Auglaize River at Wapakoneta (St.).

†Pisidium cruciatum Sterki. ×

Tuscarawas River, Miami Canal at Hamilton (St.).

†Pisidium fallax Sterki.

Rivers, creeks and races in Portage, Summit, Stark and Tuscarawas Counties; Miami Canal at Hamilton; San-dusky and Maumee Rivers (all: St.).

Pisidium fallax mite Sterki.

Nimishillen Creek at Canton (St.).

†Pisidium punctatum Sterki.

Portage, Summit, Stark and Tuscarawas Counties, various places; Ohio River at Cincinnati; Miami Canal at Hamilton (all: St.); doubtless all over the state, in running water.

Pisidium variable Prime.

Summit, Stark and Tuscarawas Counties (St.). Probably all over the state.

†Pisidium affine Sterki.

Springfield Lake, Meyer's Lake (St.).

†Pisidium sargentii Sterki.

Portage, Stark and Tuscarawas Counties, various places (St.); Cuyahoga Co.! (Allen).

†Pisidium noveboracense Prime.

Summit, Stark, Tuscarawas, Erie Counties (St.); Geauga Co.! (Streator); Puritas springs, Cuyahoga Co.! not typical (Allen). Decidedly variable.

Pisidium noveboracense elevatum Sterki.

Sandusky (St.).

Pisidium noveboracense quadrulum Sterki, and form *proclive* St. Tuscarawas Co., various places (St.).**†Pisidium succineum** Sterki.

Tuscarawas Co., various places (St.).

†Pisidium walkeri Sterki.

Portage, Stark, Tuscarawas Counties (St.); Hamilton Co.! (Cincinnati Museum).

†Pisidium mainense Sterki.

Navarre, Stark Co. (St.).

†Pisidium neglectum Sterki.

Krumroy, Summit Co., Canal Dover, Tuscarawas Co. (St.); Dover, Cuyahoga Co.! (Allen).

†Pisidium trapezoideum Sterki.

Summit, Tuscarawas and Auglaize Counties (St.).

†Pisidium roperi Sterki.

Hudson, Summit Co.! (Pettingell).

†Pisidium streatori Sterki.

Garretttsville! (Streator); Justus, Stark Co. (St.); Columbus! (Moores); Geauga Lake, east of Cleveland! (Allen).

Pisidium abitum Haldeman.

Over the state; very variable. Under this name, most of our Pisidia, even of widely different groups, are listed and in collections. All of them should be revised.

†Pisidium strengii Sterki.

Garretttsville (St.); Dover, Cuyahoga Co.! (Allen).

†*Pisidium politum* Sterki.

Tuscarawas Co., various places (St.).

†*Pisidium politum decorum* Sterki.

Dover, Cuyahoga Co.! (Allen); Meyer's Lake, Canton (St.);
Tuscarawas Co., various places (St.).

†*Pisidium splendidulum* Sterki.

Cuyahoga River at Hiram, Sandusky, various places in
Tuscarawas Co. (St.); decidedly variable.

†*Pisidium rotundatum* Prime.

Garrettsville! (Streator); Justus, Stark Co. (St.).

†*Pisidium ohioense* Sterki.

Garrettsville! (Streator).

†*Pisidium medianum* Sterki.

Springfield Lake (St.); probably at least over the northern
part of Ohio.

†*Pisidium pauperculum* Sterki.

Springfield Lake (St.).

***Pisidium pauperculum crystalense* Sterki.**

Cuyahoga River, Nimishillen Creek at Canton (St.).

NOTE: All of these Pisidia are widely distributed, outside
of Ohio, and most of them will be found over the state.

SUPPLEMENTARY LISTS.

In the following list, some Ohio species are enumerated, which were not known when earlier lists and descriptive works were published, or misunderstood. Specimens are probably mixed in among other similar forms, and all such lots in collections should be looked over carefully.

Gastrodonta collisella Pilsbry may be among *gularis*, and *ligera*; (from the latter it is at once distinguished by its lamellæ).

Zonitoides laeviusculus Sterki, among *minusculus*.

Hyalina wheatleyi Bland, and others, among *H. radiatula*, *Zonitoides arboreus*, etc.

Hyalina lamellidens Pilsbry, among *multidentata*.

Euconulus chersinus Say, among *fulvus*, and vice versa!

Vallonia excentrica Sterki, among *pulchella*.

Vallonia parvula Sterki, among *costata*, and all of these species among "pulchella."

Strobilops affinis Pilsbry and *virgo* Pilsbry, among *labyrinthica*.

Bifidaria procera Gould, as *Pupa rupicola* Say, and among *Vertigo*.

Bifidaria holzingeri Sterki, among *pentodon*.

Bifidaria pentodon Say, among *tappaniana*; notice the change of names.

Vertigo tridentata Wolf, *pygmæa*-Drap., *morsei* Sterki, among *ovata*.

Vertigo parvula Sterki, *bollesiana* Morse, among *milum*, *gouldii*, and others.

Carychium exile H. C. Lea, among *exiguum*, and both species among small Pupidæ.

Physa aplectoides Sterki, among *gyrina* etc., and *Aplexa hypnorum*.

Lymnæa parva Lea, *sterkii* Baker, among any of the smaller, and young, Lymnææ.

Planorbis umbilicatellus Cockerell, among *parvus*.

Planorbis opercularis multilineatus Vanatta, among *dilatatus*.

Planorbis rubellus Sterki, among *excavous*.

Gundlachia species among *Ancylus*!

Ancylus, various species, among any in collections.

Amnicola pilsbryi Walker, and other small forms, among *limosa*, *cincinnatiensis*, etc.

Valvata bicarinata Lea, among *tricarinata*.

Lampsilis fallaciosa Simpson, among *anodontoides*.

Sphærium flavum Prime, and probably others, among *striatinum*.

Musculium, various species, among any in collections.

Pisidium, many species, among any lots on hand, especially "*abditum* Hald."

A Few Species Not Recorded from Ohio, Probably or Possibly to be Found.

Hyalina rhoadsi Pilsbry; in various states.

Hyalina capsella Gould; Kentucky and southern Indiana.

Philomyces (Pallifera) hemphilli W. G. Binney; Kentucky and northern Michigan.

Vallonia perspectiva Sterki; Indiana, close to the Ohio line.

Vertigo bollesiana Morse; New York, Michigan, etc.

Planorbis crista Linné (v. **cristatus** Drap.); several states.

Ancylus elatior Haldeman; Kentucky.

Vivipara sp.; Indiana, etc.

Lampsilis fatua Lea; Beaver River, Pa.

Lampsilis obscura Lea; Lower Ohio River.

Sphaerium walkeri Sterki; Indiana, Michigan, Canada.

Pisidium, numerous species known from Indiana, Michigan, etc.

FOSSILS.

Fossil land and fresh-water mollusca have been collected only at few places in Ohio. Younger and older deposits should be carefully searched for them.

In the "preglacial deposits" near Middletown, first bottoms on the Miami River, examples of the following species have been collected.*

<i>Helix elevata</i> Say.	<i>Helix solitaria</i> .
" <i>concava</i> Say.	" <i>tridentata</i> .
" <i>alternata</i> Say.	<i>Goniobasis depygis</i> .
" <i>hirsuta</i> Say.	<i>Planorbis trivolvis</i> .
" <i>monodon</i> Rackett.	<i>Amnicola lapidaria</i> Say.
" <i>thyroides</i> .	<i>Succinea</i> sp.
" <i>profunda</i> Say.	

In the "Old Forest Bed" of the Ohio River, a layer of yellow clay, Mr. A. C. Billups† has collected the following species: *Vallonia pulchella* Müller. Traces.

Polygyra tridentata Say. Scarce.

" " var.	Region of the mouth much depressed. and very deeply striated.
" <i>inflecta</i> Say.	Few.
" <i>profunda</i> Say.	Very large, heavy.
" <i>albolabris</i> Say.	Very scarce.
" <i>exoleta</i> Binney.	Very common, but not found alive within twenty miles of this deposit.
" <i>multilineata</i> Say.	Most common. (Same note as of preceding.)
" <i>palliata</i> Say.	
" <i>appressa</i> Say.	
" <i>elevata</i> Say.	Fairly common.
" <i>pennsylvanica</i> Green.	Common; rare in the vicinity alive.
" <i>thyroides</i> Say.	Rather common.
" <i>mitchelliana</i> Lea.	Common, rare alive.
" <i>stenotrema</i> Fer.	
" <i>monodon</i> Rackett.	Very rare.

Pupoides marginatus Say.

Bifidaria contracta Say.

" *armifera* Say. Common.

Cochlicopa lubrica Müller.

Circinaria concava Say. Common.

Vitrea hammonis Ström. Several examples.

* See Geological Survey of Ohio, Vol. III, Warren and Butler Counties

† The Nautilus XVI, p. 50. (Sept., 1902).

Gastrodonta ligera Say. Common.

Pyramidula alternata Say. Very large.

“ **solitaria** Say. Plentiful, large.

“ **perspectiva** Say. Rare.

“ **striatella** Anth. Rare.

Helicodiscus lineatus Say. Rare.

Succinea sp. Very large.

Pomatiopsis lapidaria. Common.

Four miles east of Defiance, in a sandy deposit (loess?), forming the north bank of the Maumee River, at the state dam, I have collected, Oct. 27, 1906, the following 27 species:*

Gastrodonta ligera Say.

Zonitoides arboreus Say.

“ **læviusculus** Sterki.

Hyalina radiatula Alder.

“ **indentata** Say.

Circinaria concava Say.

Polygyra profunda Say. Common.

“ **multilineata** Say. Common.

“ **albolabris** Say.

“ **zaleta** Binney.

“ **clausa** Say.

“ **mitchelliana** Lea.

“ **thyroides** Say.

“ **elevata** Say. The commonest of the Polygyra.

“ **fraudulenta** Pilsbry.

“ **inflecta** Say.

“ **hirsuta** Say.

Patula solitaria Say, common.

“ **alternata** Say.

“ **striatella** Anthony.

Bifidaria contracta Say.

Succinea avara Say.

“ **retusa** Lea, or near.

Physa sp. (one specimen, broken to fragments).

Pomatiopsis lapidaria Say. Abundant.

Pisidium compressum Prime.

“ **fallax** Sterki.

Of Unionidæ, fragments were common, but all too small to be identified.

* Since I had chance to collect there only once, and during a short time, notes with respect to frequency and scarcity are insufficient. There is no doubt that many other species will be found in that deposit, which probably has a wide extension.

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